

IN THE CLAIMS

Please amend the status of the claims to that as indicated below:

Claims 1-58 (canceled)

59. (new) An apparatus for measuring hemoglobin index (HbI) in blood of a patient, comprising:

a light source generating broadband light;

a light-transmission arrangement including a plurality of transmitting fibers positioned for simultaneously transmitting multiple wavelengths of said broadband light from said light source to the blood of the patient;

an optical fiber arrangement having a plurality of light detector fibers for leading multi-wavelength light, in spectrally unseparated form, transmitted through, or reflected from, the blood;

a light detection arrangement receiving said multi-wavelength light in its spectrally unseparated form from said optical fiber arrangement, for spectrally decomposing the received light, and for determining amplitudes of selected wavelengths of the decomposed light; and,

means for utilizing a non-pulsatile element of the blood of the patient for determining a measurement of the hemoglobin index (HbI) in the blood as a function of the amplitudes of the selected wavelengths.

60. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, further comprising means for utilizing a pulsatile element of the blood of the patient for determining the measurement of at least one analyte in the blood.

61. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, further comprising a plurality of closely associated transmitters and generators for providing an "average-evened out" signal to be produced for representing the measurement of at least one analyte in the blood.

62. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, wherein said apparatus is capable of measuring blood glucose level.

63. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, wherein said apparatus is capable of measuring blood oxygen saturation (SO₂).

64. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, further comprising means for measuring temperature of the blood of the patient.

65. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, wherein said apparatus is capable of measuring at least two analytes in the blood of a patient, with one analyte of said at least two analytes being hemoglobin index (HbI) and at least one additional analyte being selected from blood glucose level, blood oxygen saturation (SO₂), and temperature of the blood of the patient.

66. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 65, wherein said apparatus is capable of measuring at least two analytes in the blood of the patient via a computer program.

67. (new) The apparatus for a measuring hemoglobin index (HbI) in blood of a patient according to Claim 66, wherein said computer program conducts a multiple linear regression analysis on spectral data collected by said plurality of light detector fibers.

68. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 65, wherein said apparatus is capable of measuring each of blood glucose level, blood oxygen saturation (SO₂), hemoglobin index (HbI) and temperature of the blood of the patient.

69. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, wherein said apparatus includes a greater number of said transmitting fibers than said light detector fibers.

70. (new) The apparatus for measuring hemoglobin index (HbI) in the blood of patient according to Claim 59, wherein said light detector includes 6 through 18 of said light detector fibers.

71. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 70, wherein said light detector includes 12 of said detector fibers

72. (new) The apparatus for measuring hemoglobin index (HbI) in blood of patient according to Claim 59, wherein said light detector fibers and said transmitting fibers each have diameters of from 200 to 300 microns.

73. (new) The apparatus for measuring hemoglobin index (HbI) in blood of

patient according to Claim 59, wherein said light detector fibers are positioned for detecting transmitted light rather than reflected light.

74. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, wherein said light source generates light over a spectrum including a wavelength region of from 500 to 1,100 nm.

75. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 74, wherein said source generates light over a spectrum including said wavelength region of from 800 to 1,100 nm.

76. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 59, wherein said multiple wavelengths of said broadband light from said light source include the wavelengths of 500.9 nm, 528.1 nm, 549.5 nm, 561.1 nm, 572.7 nm and 586.3 nm.

77. (new) The apparatus for measuring hemoglobin index (HbI) in blood of a patient according to Claim 74, wherein said multiple wavelengths of said broadband light from said light source include the wavelengths of 500.9 nm, 528.1 nm, 549.5 nm, 561.1 nm, 572.7 nm, 586.3 nm and from 800 to 1,100 nm.

78. (new) A method for measuring blood oxygen saturation in blood of a patient, comprising the steps of:

placing against a body part of a patient an apparatus for a non-invasive measurement of at least one analyte in blood in a body part of a patient, said apparatus comprising:

a light transmitter having a plurality of transmitting fibers positioned for transmitting light to the body part of the patient;

a light detector having a plurality of light detector fibers for detecting light transmitted through, or reflected from, the body part of the patient;

means for utilizing a non-pulsatile element of the blood in the body part of the patient for determining a measurement of at least one analyte in the blood; and,

means for measuring blood oxygen saturation (SO₂), said means for measuring blood oxygen saturation (SO₂) including calculation means using the equation:

$$SO_2 = 100 \cdot (OXI + 0.43)/1.5,$$

wherein,

OXI is the oxygenation index of the blood of the patient and is defined by the equation:

$$OXI = [(e - d)/11.7 - (d - c)/11.6] \cdot 100/HbI,$$

wherein,

HbI is the hemoglobin index of the blood of the patient and is defined by the equation:

$$HbI = [(b - a)/27.1 + (c - b)/21.4 + (c - e)/23.3 + (c - f)/13.6] \cdot 100,$$

and wherein,

a = absorption value at 500.9 nm wavelength of light;

b = absorption value at 528.1 nm wavelength of light;
c = absorption value at 549.5 nm wavelength of light;
d = absorption value of 561.1 nm wavelength of light;
e = absorption value of 572.7 nm wavelength of light; and,
f = absorption value of 586.3 nm wavelength of light;

and,

utilizing said light detector of said apparatus for measuring light transmitted through, or reflected from, the body part of the patient.

79. (new) A computer program for measuring one or more of the hemoglobin index, the oxygenation index or the blood oxygen saturation level in blood of a patient, comprising:

a computer readable medium having computer program code means on said computer readable medium, said computer program code means calculating one or more of the following equations:

HbI is the hemoglobin index of the blood of the patient and is defined by the equation:

$$\text{HbI} = [(b - a)/27.1 + (c - b)/21.4 + (c - e)/23.3 + (c - f)/13.6] \cdot 100,$$

wherein,

a = absorption value at 500.9 nm wavelength of light;
b = absorption value at 528.1 nm wavelength of light;
c = absorption value at 549.5 nm wavelength of light;
d = absorption value of 561.1 nm wavelength of light;
e = absorption value of 572.7 nm wavelength of light; and,
f = absorption value of 586.3 nm wavelength of light;

OXI is the oxygenation index of the blood of the patient and is defined by the equation:

$$\text{OXI} = [(e - d)/11.7 - (d - c)/11.6] \cdot 100/\text{HbI}; \text{ and,}$$

SO₂ is the blood oxygen saturation of the blood of the patient and is defined by the equation:

$$\text{SO}_2 = 100 \cdot (\text{OXI} + 0.43)/1.5.$$

80. (new) An apparatus for a non-invasive measurement of at least one analyte in blood in a body part of a patient, comprising:

a light transmitter having a plurality of transmitting fibers positioned for transmitting light to the body part of the patient;

a light detector having a plurality of light detector fibers for detecting light transmitted through, or reflected from, the body part of the patient; and,

means for utilizing a non-pulsatile element of the blood in the body part of the patient for determining a measurement of at least one analyte in the blood, said measurement of said at least one analyte including means for measuring blood oxygen saturation (SO₂) using the equation:

$$\text{SO}_2 = 100 \cdot (\text{OXI} + 0.43)/1.5,$$

wherein,

OXI is the oxygenation index of the blood of the patient and is defined by the equation:

$$\text{OXI} = [(e - d)/11.7 - (d - c)/11.6] \cdot 100/\text{HbI},$$

wherein,

HbI is the hemoglobin index of the blood of the patient and is defined by the equation:

$$\text{HbI} = [(b - a)/27.1 + (c - b)/21.4 + (c - e)/23.3 + (c - f)/13.6] \cdot 100,$$

wherein,

a = absorption value at 500.9 nm wavelength of light;

b = absorption value at 528.1 nm wavelength of light;

c = absorption value at 549.5 nm wavelength of light;

d = absorption value of 561.1 nm wavelength of light;

e = absorption value of 572.7 nm wavelength of light; and,

f = absorption value of 586.3 nm wavelength of light

81. (new) An apparatus for a non-invasive measurement of at least one analyte in blood in a body part of a patient, comprising:

a light transmitter having a plurality of transmitting fibers positioned for transmitting light to the body part of the patient;

a light detector having a plurality of light detector fibers for detecting light transmitted through, or reflected from, the body part of the patient; and,

means for utilizing a non-pulsatile element of the blood in the body part of the patient for determining a measurement of at least one analyte in the blood, said measurement of said at least one analyte including means for measuring the hemoglobin index (HbI) includes calculation means using the equation:

$$\text{HbI} = [(b - a)/27.1 + (c - b)/21.4 + (c - e)/23.3 + (c - f)/13.6] \cdot 100,$$

wherein,

a = absorption value at 500.9 nm wavelength of light;

b = absorption value at 528.1 nm wavelength of light;

c = absorption value at 549.5 nm wavelength of light;

d = absorption value of 561.1 nm wavelength of light;

e = absorption value of 572.7 nm wavelength of light; and,

f = absorption value of 586.3 nm wavelength of light.